

Claims

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1. A power control system in a mobile system based at least partly on the spread spectrum technique and having at least one mobile station and at least one base station, **characterised** in that the transmit power of more than one bearer is determined at a time with the aid of the method, and that the method comprises steps, in which - a control function is formed at least partly on the basis of a quantity which at least partly represents the fast fading experienced by at least one bearer, and - the control function is calculated in order to determine new output power values of said more than one bearer.

10 2. A method according to claim 1, **characterised** in that the control function is formed at least partly on the basis of an at least partial history of the power control of at least one bearer.

15 3. A method according to claim 1, **characterised** in that the transmit power of more than one bearer is determined with the aid of the method when the transmission of at least one bearer is initiated.

4. A method according to claim 1, **characterised** in that it comprises a step in which the transmit power of more than one bearer is determined when the transmission of at least one bearer is terminated.

20 5. A method according to claim 1, **characterised** in that it comprises a step in which the transmit power of more than one bearer is determined when the transmit power of at least one bearer changes.

6. A method according to claim 1, **characterised** in that it comprises a step in which the transmit power of more than one bearer is determined when the target level of the correctness of at least one bearer changes.

25 7. A method according to claim 1, **characterised** in that it comprises a step in which the transmit power of more than one bearer is determined when the transmission rate of at least one bearer changes.

30 8. A method according to claim 1, **characterised** in that it comprises a step in which the transmit power of more than one bearer is determined when at least one base station of at least one bearer is changed in a macro diversity combination.

9. A method according to claim 1, **characterised** in that the control function is at

least partly formed also on the basis of the desired correctness levels of the bearers.

10. A method according to claim 1, **characterised** in that it further comprises a step in which it is checked whether each determined output power value is within the range formed by the typical minimum and maximum limits of the respective
5 bearer, whereby the output power values are taken in use if no one of the values is outside said region.

11. A method according to claim 1, **characterised** in that it further comprises steps, in which

- an interference effect matrix is generated, which represents the mutual interferences of different bearers, and
10 - the generated interference effect matrix is inverted in order to form the new power levels.

12. A method according to claim 11, **characterised** in that it further comprises a step, in which at least one element value is set to zero, when the value of said element is below a certain predetermined limit.

13. A method according to claim 1, **characterised** in that

- the output powers of more than one base station and the mobile stations managed by these base stations are controlled with the method, and that
20 - the control function is formed at least partly also on the basis on how strong the signal of each base station is received in at least one mobile station of each other base station.

14. A method according to claim 1, **characterised** in that it comprises steps, in which

- more than one set of output power values is calculated,
25 - a utility function is formed in order to select one set of output power values, and - that set of output power values is selected, which minimises the value of said utility function.

15. A method according to claim 1, **characterised** in that it further comprises a step, in which a decision is made on the basis of the generated output power values
30 for allowing the transmission of at least one bearer.

16. An element of a mobile system, **characterised** in that it comprises
- means to generate a quantity which at least partly depends on the fast fading experienced by at least one bearer,

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- means to determine of the output power values for more than one bearer at least partly on the basis of said quantity, and
- means to control the output power of at least one bearer on the basis of said output power values.

- 5 17. A load control method in a mobile network, **characterised** in that it comprises steps, in which
- a power vector is calculated in order to generate candidate values to be used as powers at the beginning of the next calculation period,
 - a check is made whether the power load exceeds a predetermined limit,
- 10 whereby, if the power load exceeds said predetermined limit, at least one of the following is decreased:
- the transmit power of at least one transmission,
 - the bit rate of at least one transmission, and
 - the SIR target level of at least one transmission;
- 15 whereby said at least one transmission is selected on the basis of which transmission has a corresponding candidate power value in the power vector with the greatest ratio to the number of correctly received bits of said transmission during the previous calculation period.
- 20 18. A method to manage the transmit powers of bearers in a mobile network, **characterised** in that
- the powers of the bearers are at least partly controlled in clusters,
 - the cluster of each bearer is determined according to the state of the bearer, and that the method comprises steps, in which
 - a power vector is calculated in order to generate candidate values to be used as powers at the beginning of the next calculation period,
 - the transmit power of at least one bearer cluster is changed in accordance with the calculated candidate values.

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